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The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Sri Lanka, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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New Land - At What Price? Land Reclamation In The Philippines

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From Singapore to South Korea, many countries across Southeast Asia are reclaiming large tracts of coastline to create space for new factories, homes and recreation. The aim is to boost economic prosperity and relieve congestion, but such projects also create environmental problems.

A summary of EEPSEA Research Report 2005-RR5, *The Environmental Costs of Coastal Reclamation in Metro Cebu, Philippines* by Lourdes O. Montenegro, Annie G. Diola and Elizabeth M. Remedio., Department of Economics, University of San Carlos, P. del Rosario St., Cebu City 6000, Philippines. (Contact : lomontenegro@usc.edu.ph / aygsaba@yahoo.com)

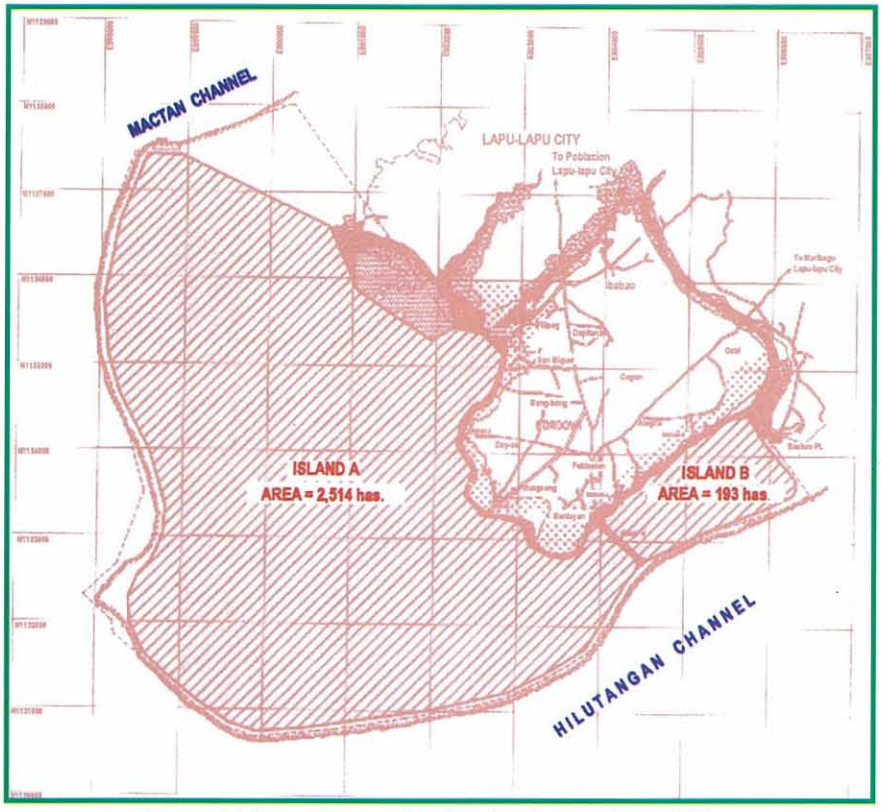
"The reclamation scheme would result...

To get a better picture of the overall economic impact of this type of development, a new study from the Philippines has looked in detail at the country's largest proposed reclamation project. It found that the environmental and social costs of the project would exceed PHP 3.3 billion (USD 59.8 million). In fact, taking into account construction costs and the economic benefits the project would bring, the reclamation scheme would result in an economic cost to society of over PHP 18.4 billion (USD 335 million). This raises profound questions about the advisability of the work and points to a number of key issues, such as the control of quarrying, that must be resolved before projects like this are given the green light.

The Cordova Reclamation Project

The study, undertaken by a team led by Lourdes O. Montenegro from the University of San Carlos, Cebu City, looked at the Cordova Reclamation Project (CRP). This ambitious scheme would reclaim almost 3,000 hectares of coastal area in the Municipality of Cordova. The Municipality of Cordova is in Metro Cebu, in the southeastern part of Mactan Island. The whole area of Metro Cebu has seen rapid industrialization and population growth. This development pressure has already resulted in five existing reclamation sites with a total area of more than 700 hectares.

The CRP encompasses the inter-tidal flats fringing the municipality and is touted as being a way of providing much-needed new housing and employment. The project has been on hold since the withdrawal of some government approvals. However, if it is carried out it will be one of the largest land reclamation projects in Southeast Asia.



Source: Malayan Integrated Industries Corporation, 1997

Proposed Reclamation Area

Reclamation and Devastation

The immediate impact of the proposed project would be on the inter-tidal flats it would destroy. These areas are of immense importance – as habitat and because of the other environmental services, such as shoreline protection, that they provide. The destruction of these areas would also have a knock-on impact on many local people who depend on them for fishing and for 'gleaning' shellfish and other food. It would also impact on tourism.

The effect of the development would not just be felt on the coastline. Despite assurances from the developers that landfill material will be obtained from the seabed, experience from other projects shows that this is technically difficult. It is therefore likely that, if the project goes ahead, large quantities of rubble from land-based quarries would be required. This quarrying would have significant environmental and social

in a net cost to society"

impacts. The researchers set out to cost all of these impacts and to compare them against the positive benefits that the project might have. In the past, such environmental costs have seldom been evaluated properly. This has led to inappropriate development and the unnecessary destruction of the natural environment.

The Impact on Fishing

To get information about the size and value of fish catches from the affected inter-tidal area, households in Cordova were surveyed. It was found that the current aggregate net fishing income from the Cordova flat was up to PHP 29.9 million (USD 516,000). It was assumed that the reclamation project would remove half of the net income from fishing on the site and that many people would have to invest in new boats so that they could fish further from home. The impact of this potential upheaval was estimated at approximately PHP 290 million (or USD 5 million) over a thirty-year period.

It was also found that over 1,500 Cordova residents engage in some form of gleaning on the intertidal flats. Using information on harvest sizes and prices, the impact of the CRP on this activity was estimated at PHP 207 million (USD 3 million) over thirty years.

Environmental Costs of the CRP

Impact	Present value (30 years, 8 % discount rate)	Valuation approach
Loss of on-site fishery	$ 5 million	Forgone fishing rents
Loss of reef flat gleaning	$ 3.7 million	Forgone net income
Loss of pollution control services from tidal flat	NA	NA
Loss of carbon sink functions of tidal flat	NA	NA
Impact on migratory birds	NA	NA
Damage to corals	$ 31.6 million	Forgone recreational benefits
Damage from landfill quarrying (increased erosion rates, risk of flooding and landslides)	$ 19.5 million	Mitigation costs
Impacts on adjacent households (temporary noise and dust pollution)	NA	NA
TOTAL	$ 59.8 million	

About 640 hectares of coral reef area would be affected by reclamation. This would cause tourism numbers in the area to slump, since many people come to enjoy the reef. The impact of the reclamation project on potential tourism income was calculated using projections of potential visitor numbers (assuming no development). Recent research on the amount people are willing to pay to enter a local protected marine area was also used. The potential cost was found to be approximately PHP 1.7 billion (USD 31.6 million).

Problems Inland

Landfill quarrying has many environmental impacts. These include the disruption of surface and ground water, increased soil erosion and the increased occurrence of landslides. The CRP would require about 1,100 small-scale mountain quarries to fulfill its requirements. To estimate the environmental costs of this quarrying, ten local quarries were examined. The cost of

mitigating the environmental impacts at these sites - through a range of measures like planting vetiver grass - was estimated at PHP 9.4 million (USD 230,700). At the scale of the CRP, this would cost more than PHP 1 billion (USD 19 million).

Overall, the environmental cost of the Cordova Reclamation Project, in present value terms, would be about PHP 3.3 billion (USD 59.8 million). Almost 86% of this would be due to damages from landfill quarrying and damage to corals. This is not to undervalue the loss to on-site fishing and reef gleaning, since these constitute significant livelihood sources for thousands of Cordova residents.

Calculating the Balance

The main financial benefit to society from the CRP would come from the economic development produced by the influx of new companies into the area. Based on the performance of existing local economic development zones, and taking into account the competition that they represent, it is likely that the CRP would attract an average of forty new firms per year and reach its full capacity in about thirty years. If each of these firms earn yearly profits similar to high-performing companies in Cebu's operational economic zones (PHP 89 million or USD 1.6 million), then the present value of this economic development would range from PHP 3.3 billion (USD 59 million) to PHP 7.2 billion (USD 129 million).

Despite these potential returns, the researchers found that the net economic impact of the CRP would not be so positive. Construction costs for the project were estimated at PHP 25.4 billion (USD 460 million). When these, and the environmental costs were taken into account, it was found that the reclamation project would yield negative net present values - even for the most optimistic projections of performance. The economic loss to society if the project is undertaken was estimated to range from PHP 18.7 billion (USD 335 million) to PHP 22.6 billion (USD 404 million).

Is This Reclamation Project The Way Forward?

These results have important implications for the optimal location and scale of the CRP, were it to proceed. They point to the need to reduce the project's impact on fishing and coral. This could be done if the CRP avoids the southern or southeastern part of the proposed development area. This is where coral cover is fair or good and where the bulk of fishing and gleaning households can be found.

The findings also highlight the potential impact of small-scale quarrying and the difficulty of monitoring and regulating such a large (and dispersed) undertaking. They also provide an estimate of how much money should be set aside to compensate local people for lost income and to pay for environmental clean up: about PHP 3.4 billion (USD 60 million).

Overall, it is clear that the Cordova Reclamation Project as it stands is not an optimal development strategy. Other options open to the municipality include sustainable eco-tourism or reclamation work on a smaller scale. The latter may yield as much actual economic benefit as the proposed scheme, while producing less landfill damage and lower external costs.

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